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ABSTRACT

As part of an effort to address the problem of the technological update of vocational and technical teachers, the National Center for Research in Vocational Education conducted a status study to determine the nature and extent of the problem with respect to institutional level and occupational area. A second aspect of the study dealt with currently used approaches to the technological update of teachers. This phase of the study resulted in descriptions of the following nine promising approaches to the task of providing teacher technological update: work experience internships; university and college course work; workshops, conferences, and seminars; industry observation; education and industry staff exchange; part-time employment; local programs; nonlocal programs; and industry training and updating programs. Of these, workshops, conferences, and seminars were the most widely used approach to teacher update. This was true for both secondary and postsecondary instructors, with all but one of the 18 consultants providing data in the study citing this approach. Another approach that was identified as having a high potential for success was that of organizing collaborative activities and programs among schools, business, and industry for teacher occupational experiences and curriculum content revision. Singled out as a particularly noteworthy example of this type of program was the Kentucky Vocational Staff and Industry Exchange Program. (MN)

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APPROACHES TO TECHNOLOGICAL UPDATE OF VOCATIONAL/TECHNICAL TEACHERS

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APPROACHES TO TECHNOLOGICAL UPDATE OF
VOCATIONAL/TECHNICAL TEACHERS

Overview of Recent National Center Efforts

The task of keeping vocational and technical teachers abreast of the technology of their occupational fields is becoming increasingly more important but, at the same time, more difficult. Rapidly expanding technologies and the application of new technology within existing occupations create needs for trained workers that many vocational and technical teachers are not equipped to handle. Many teachers, having acquired their technology-related skills during earlier stages of technology development, are finding those skills out of date. The rate of technological change and expansion makes continual updating of instructors' skills and knowledge a necessity. Yet, often this does not occur and the reduced turnover rate among teachers, accompanied by longer tenure in their positions, causes increasing disparity between their technical competence and current technology in their fields of instruction.

In addressing the multifaceted problem of technological update of teachers, the National Center sought a clearer picture regarding the nature and dimensions, of the problem. The specific objectives of a status study conducted[1] were:

1. To determine the nature and extent of the problem at both secondary and postsecondary levels

2. To determine the extent of the problem relative to occupational areas

3. To identify the technologies in which the problem is most critical

Knowledgeable individuals were identified in nine states to prepare papers for the National Center presenting their perceptions of the nature and extent of the need for technological update of secondary vocational teachers in their respective states. The consultants were also asked to describe approaches used for technological update of teachers in their states, the apparent effectiveness of the approaches, and barriers to those approaches. Similarly, consultants were identified in an additional nine states to prepare papers presenting their perception of the nature and extent of the problem of technological update of postsecondary vocational/technical teachers and approaches utilized in their respective states.

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1. James B. Hamilton, Michael E. Wonacott, and Adonia Simandjuntak. Technological Update of Vocational/Technical Teachers: A Status Report. Columbus, OH: The National Center for Research in Vocational Education, The Ohio State University, 1982.

Information regarding each topic addressed by the consultants was aggregated and summarized separately for those addressing vocational teacher technological update at the secondary level and those addressing it at the postsecondary level.

Results of the study showed that large numbers of vocational/technical teachers at both the secondary and postsecondary levels are considered to have substantial or critical need for updating in the technology of their teaching fields (table 1 and table 2).

Nearly one-half of all postsecondary instructors are considered to be in need of update and 30% of secondary vocational teachers are in need of technological update. The need exists for all occupational service areas at both the secondary and postsecondary levels; however, within occupational service areas, needs vary widely by occupational program. New technological developments or applications were considered to be the major factors contributing to the need.

A second aspect of the National Center study dealt with approaches to technological update of teachers. This portion of the study resulted in descriptions of nine promising approaches to the task of providing teacher technological update.[2] Each description includes the potential of the approach for providing update, its own administrative characteristics, advantages and disadvantages, and barriers and facilitators in its implementation. Descriptions are also provided of specific programs that exemplify each approach.

First, six specific delivery techniques are described: work experience internships; university and college course work; workshops, conferences, and seminars; industry observation; education and industry staff exchange; and part-time employment. Second, three different types of update programs are described: local programs; nonlocal programs; and industry training and updating programs. Current approaches to technological update are shown in table 3.

Workshops, conferences, and seminars were found to be the most universally used approach to vocational/technical teacher update. This was true for both secondary level teachers and postsecondary instructors, with all but one of the eighteen consultants citing this approach. Consultants' papers indicated that university/college course work, summer employment, certification/recertification requirements, and university/college technical update programs were in use in approximately one-half of the states included in the

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2. Michael E. Wonacott and James B. Hamilton. Approaches to Technological Update of Vocational/Technical Teachers. Columbus, OH: The National Center for Research in Vocational Education, The Ohio State University, 1983.

Table 1

Need for Technological Update of Postsecondary Instructors by Occupational Areas in Eight Selected States

Occupational Area	Number of Instructors	Numbers and Percentages of Instructors in Need of Updating in the Technology of Their Teaching Field							
		No Need		Limited Need		Substantial Need		Critical Need	
		No.	%	No.	%	No.	%	No.	%
Agriculture	302	21	7	137	45	86	28	58	19
Marketing and Distribution	493	124	25	239	48	97	20	37	7
Home Economics-Occupational	389	36	9	188	48	105	27	60	15
Health Occupations	1359	319	23	620	46	277	20	143	11
Office Occupations	2558	326	13	846	33	640	25	746	29
Technical and Trade and Industry	4511	763	17	1535	34	1056	23	1157	26
TOTALS	9612	1589	17	3565	37	2261	24	2201	23

NOTE: "Need" is that identified or estimated by knowledgeable consultants from each state. Only eight of the nine states are represented because one of the consultants was reluctant to make estimates without further primary-source information.

Table 2

Need for Technological Update of Secondary Teachers by Occupational Areas in Seven Selected States

Occupational Area	Number of Teachers	Numbers and Percentages of Teachers in Need of Updating in the Technology of Their Teaching Field							
		No Need		Limited Need		Substantial Need		Critical Need	
		No.	%	No.	%	No.	%	No.	%
Agriculture	5,952	1205	20	2961	50	1455	24	331	6
Marketing and Distribution	2,501	218	9	1741	70	472	19	70	3
Home Economics - Occupational	5,326	2736	51	1565	21	796	15	229	4
Health Occupations	1,122	98	9	575	51	380	34	69	6
Office Occupations	6,206	2681	43	1856	30	1366	22	303	5
Technical and Trade and Industry	6,380	1078	17	2595	41	1827	29	880	14
TOTALS	27,487	8016	29	11293	41	6296	23	1882	7

NOTE: "Need" is that identified or estimated by knowledgeable consultants from each state. Only seven of the nine states are represented because two of the consultants were reluctant to make estimates without further primary-source information.

Table 3

Approaches to Vocational/Technical Teacher Technological Update Currently in Use in Eighteen Selected States

Approach Description	Numbers of States Reported to be Using the Approach: Postsecondary Level (N=9)	Secondary Level (N=9)	Totals
Workshops/Conferences/ Seminars	8	9	17
University/College Course Work	5	4	9
Summer Employment	4	5	9
Certification/Recertification Requirements	4	7	11
Instructor Participation in Business/Industry Training Programs	4		4
Business/Industry Technical Update Programs	4		4
University/College Technical Update Programs	3	5	8
Business/Industry Exchange Programs	3	3	6
Return-to-Industry Programs	2		2
Visits to Business/Industry	2	3	5
Hiring Current Business/ Industry Employees	2		2
Inservice Training Conducted by State/Local	2		2
Facilitation of Performance-Based Teacher Education		1	1
Business/Industry Representatives Serving on Advisory Committees		1	1
Business/Industry Representatives Participating in Curriculum Revision		1	1

study. The use of these approaches for updating secondary teachers and postsecondary instructors was roughly equal. Business/industry exchange programs and visits to business/industry were reported as being in use in approximately one-third of the states and for teachers at both the secondary and postsecondary levels.

Instructors' participation in business/industry training programs and business/industry technical update programs were each used by four states for postsecondary instructor update; however, they were not reported as in use at the secondary level for the states represented. Other approaches used at the postsecondary level but not at the secondary level were return-to-industry programs, hiring current business/industry employees, and inservice training conducted by state/local agencies. Utilization of the various approaches varied considerably among different occupational service areas within their respective states.

The unavailability of resources in terms of time, money, and links with external organizations was perceived by most consultants as being a barrier to successful technological update of vocational/technical teachers. This was true for both secondary and postsecondary teacher update. Lack of awareness of need on the part of administrators and teachers and the lack of motivation by teachers and administrators were also identified as barriers by nearly half of the consultants. Lack of equipment and lack of expertise were mentioned less frequently but were noted as barriers to teacher technological update at both the secondary and postsecondary levels.

Consultants almost universally agreed that two approaches to teacher technological update had high potential for success. As shown in table 4, these were (1) workshops/conferences/seminars and (2) collaborative activities/programs between schools and business/industry for teacher occupational experiences and curriculum content revision. As an example of a collaborative approach, Kentucky's very successful Vocational Staff/Industry Exchange Program will be discussed as a part of this paper. At least one-half of the consultants also identified (a) inservice courses conducted by the university/college in cooperation with state/local agency and business/industry; (b) facilitation of summer employment of the teachers; and (c) modification of certification/recertification requirements. The latter approach was cited by twice as many secondary as postsecondary consultants. University/college coursework was cited as a high-potential approach by nearly half the consultants. Only postsecondary consultants suggested instructor participation in business/industry training programs, professional meetings and promotion of aggressive advisory committees as high-potential approaches to teacher update. Yet surprisingly, in spite of the battery of approaches available, vocational/technical teachers remain in need of technological updating and in fact, the need for technological updating appears to increase with time.

This poses a curious question: With a repertoire of approaches available and in use, why is it that the need for technological updating of vocational/technical teachers is increasing as time passes?

Table 4

Approaches with Greatest Potential for Successful Technological Update of Vocational/Technical Teachers

Approach Description	Numbers of Consultants Citing Approach: Postsecondary Level (N=9)	Secondary Level (N=9)	Totals
Workshops/Conferences/ Seminars	8	9	17
Collaborative Activities/ Programs Between Schools and Business/Industry for Teacher Occupational Experiences and Curriculum Content Revision	8	8	16
Inservice Courses Conducted by University/College in Cooperation with State/ Local Agency and Business/ Industry	5	6	11
Modification of Certification/ Recertification Requirements	3	6	9
Facilitation of Summer Employment of Teachers	5	4	9
Instructor Participation in Business/Industry Training Programs	4		4
Professional Meetings	4		4
University/College Course Work	4	3	7
Teacher Visits to Business/Industry	2	3	5
Hiring Current Business/ Industry Employees	2	2	4
Commitment of Professional Teacher Organizations		2	2
Promotion of Aggressive Advisory Committees	2		2
Facilitation of Performance/ Competency-Based Education		2	2

Review of the literature and analysis of both approaches and barriers identified in current observer perceptions suggest an answer. The state of the art in technological updating focuses on the implementation of individual approaches--tactics--for linking vocational/technical teachers with sources of up-to-date expertise in their own occupational fields. We find that the tactics are individually sound but do not, in the end, attain the desired result (i.e., vocational/technical teachers who remain abreast of the technologies of their fields), because the individual tactics, of themselves, fail to provide the range of opportunities necessary to meet diverse situational needs of all teachers. They also fail to provide the incentives, motivation, coordination, and resources necessary to obtain and sustain the necessary high level of participation by teachers.

We have concluded, therefore, that contemporary efforts in providing of technological updating lack a holistic strategy or overall plan for effective selection, application, coordination, and management of existing technological updating tactics and creative adaptations of those tactics by state departments of education, vocational teacher educators, and local and district school administrators. The National Center with the assistance of a national panel of experts, is currently working on developing such an overall strategy.

The following nine Essential Strategy Characteristics have been identified and are serving as major structural elements in the strategy development:[3]

- The strategy should provide an organization or structure for action--i.e., a logical sequence of steps to follow in designing and carrying out technological update programs or activities.

- The strategy should define the roles and responsibilities of all the individuals involved--teachers, administrators, department of education personnel, teacher educators, and business/industry/labor participants.

- The strategy should present policy statements to support the roles and responsibilities of those involved and activities in which they participate.

- The strategy should define and provide the resources necessary and available to teachers for participating in activities to gain technological update.

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3. James B. Hamilton and Michael E. Wonacott. Strategy for Technological Update of Vocational/Technical Teachers. Columbus, OH: The National Center for Research in Vocational Education, The Ohio State University, 1983.

- The strategy should provide incentives and rewards to achieve and maintain motivation to participate in technological update activities.

- The strategy should identify and provide a variety of techniques by which teachers can gain technological updating.

- The strategy should allow for and provide alternative and creative configurations of techniques to best meet the individual needs of teachers seeking update.

- The strategy should provide for the incorporation of the knowledge and skills gained in update activities into the program of course materials.

- The strategy should provide for continuing and self-renewing activities to gain technological update on the part of all involved.

Overview of the Kentucky Vocational Staff/Industry Exchange Program

Introduction

One of Kentucky's approaches to keeping vocational teachers up-to-date is the Business/Industry Exchange Program--Kentucky calls it the Kentucky Vocational Staff Industry Exchange Program.

The Staff Industry Exchange Program is a state-operated and funded program for all vocational teachers and administrators in Kentucky. The program is designed to enable vocational teachers and administrators to gain short-term, up-to-date work experience.

The Staff Exchange Program provides a communication link between vocational educators and business/industry:

Business and industry is concerned with the recruitment, selection and employment of qualified workers.

Vocational education is concerned with properly training or retraining people with job-entry skills, knowledge, and attitudes required by business/industry.

The Staff Exchange Program is the vehicle that provides vocational educators an opportunity to keep abreast of the changing technological advances and employability skills required for employment. At the same time, it provides business/industry people an opportunity to learn more about vocational education's curricula, facilities and equipment, and teaching methods being utilized in the schools.

> This working arrangement will provide both vocational educators and business/industry personnel with opportunities to observe, assist and perform current practices of business and industry and vocational education. At the same time, provide opportunities for both parties to have input into the decisions which can improve the quality of training people for jobs.

Since 1974, over 2,500 vocational teachers and vocational administrators and 750 business industrial firms have been involved in Staff Industry Exchange.

A successful program of Staff Exchange depends on careful planning prior to and throughout the program. Figure 1 is a list of the five phases that Kentucky has adopted to provide guidance and direction to participants who desire to participate in the Staff Exchange Program.

Impact of Staff Exchange Program

The Staff Exchange Advisory Committee recommended a research project be conducted in 1981 to identify the strengths and weaknesses of the program.

The concern of the advisory committee was: Is the program doing the job it was designed to do? That being, to update vocational educators and provide practical insight for the revision of instructional programs and/or administrative duties and responsibilities. Also, is business, industry becoming more involved with vocational education programs as a result of Staff Exchange?

The purpose of this study was to assess the impact of Kentucky's vocational Staff Exchange program on instructional methods and content and on industry involvement in vocational education.

Objective I: Assess the impact of Staff Exchange experiences in bringing about changes in vocational instructional methods and content.

A. Assess the extent of these changes
B. Assess the nature of these changes
C. Assess the effects of teacher educator contacts in bringing about these changes

Figure 1

Staff Industry Exchange Program Outline

Phase I

GETTING INVOLVED IN THE
STAFF EXCHANGE PROGRAM

Develop self-assessment for professional, educational, technical, and occupational needs 1 to 5 year plan

Identify specific objective for self, professional, and instructional improvement through work experience

Phase II

APPLICATION FOR STAFF EXCHANGE

Planning Work Experience/
Objectives for Staff Exchange

Educator works with immediate supervisor to:
--Identify business/industry to meet their objectives (orientate B/I sponsor)
--Plan work schedule (weeks and hours)
--Extended employment approved

Regional contact person will forward approved copies of application to:
--Teacher education involved in granting college credit
--Applicants
--Immediate supervisors
--Staff exchange program director
--Business/industry sponsor

Phase III

STAFF EXCHANGE WORK EXPERIENCE SCHEDULE

All applicants for staff exchange will
be visited and evaluated by
the immediate supervisor

NOTE: College credit

The educator will be visited and evaluated
on-the-job by the teacher educator
if college credit is being granted

Phase IV

STAFF EXCHANGE OUTCOMES

Provide guidance and direction in helping
the educator to implement their work experience
into their instructional program

The educator implements his/her staff
exchange work experience into their
instructional program

Desired objectives:
--Methods of instruction
--Organization and management
of instruction
--Skills, knowledge and
attitude development
--Professional development
--Personal development

Phase V

EVALUATION RESULTS OF SELF-ASSESSMENT PLAN
(1 to 5 year plan)

Review and identify staff
exchange work experience objectives

Evaluate the results of self assessment
(1 to 5 year plan)

Objective II: Assess the impact of Staff Exchange in bringing about business industry involvement in vocational education

Expected Outcomes: Impact assessment data will provide for an objective evaluation of the Staff Exchange Program. Factors of "Staff Exchange" experiences which contribute most to improving instructional methods and content and to increasing business and industry involvement in vocational education may be used to develop guidelines and procedures for improving the effectiveness of the program.

Procedures. A survey consisting of a questionnaire was sent to all vocational educators and business and industrial participants who have been involved in the Staff Exchange Program since it began in 1974-75. The questionnaire was designed to identify specific changes that have taken place as a result of the Staff Exchange Program.

Further personal interviews with vocational educators and business and industry participants were conducted to validate findings. A random sample of 35 vocational educators and 35 business and industry participants were used for this validation.

Returned data was assessed to determine program impact based on survey questionnaire data and personal interviews. The data provided an objective evaluation of the Staff Exchange Program.

Findings. The findings of this research project are based on three separate questionnaires that were administered to vocational teachers, administrators, and business/industry people who have participated in the Staff Exchange Program in Kentucky. Also, personal interviews were conducted with 35 educators and 25 business/industry people who participated in the program.

Details concerning finding results are included in the final report of the Staff Exchange research project.

Overall, the questionnaires and personal interview data indicated positive feedback concerning Staff Exchange's many contributions to the improvement of the quality of vocational education. Also significant feedback of business/industry's involvement in vocational education as a result of the Staff Exchange Program.

The following findings were considered to be significant related to Staff Exchange Program Improvement:

1. Lack of immediate supervisor's involvement in the management and evaluation of Staff Exchange Programs.

2. Ineffective results of the teacher educators in on-the-job evaluation (providing help to educators-on-site-evaluation).

   -- Providing help to teachers with improvement of instruction following Staff Exchange work experiences.

3. Lack of communication between various parties concerned with carrying out various duties and responsibilities of Staff Exchange.

4. Too much paperwork or the duplication of paperwork required by participants in Staff Exchange Program.

5. Lack of understanding of Staff Exchange responsibilities of business/industry on-the-job. (Even though this was not identified as a problem by B/I person interviewed.)

6. Lack of involvement of the reimbursed vocational teachers and administrators (during the past 7 years).

7. Lack of planning and identification of specific objectives for personal and professional development through Staff Exchange.

8. Lack of follow-up activities that are required to implement Staff Exchange experiences into instructional improvement.

9. More time on the job to achieve desired objectives of Staff Exchange.

10. Staff Exchange applications should be made at least 20 days prior to date scheduled of exchange.

11. More opportunities for the involvement of business/industry persons in vocational education activities (in school-settings).

Recommendation for program improvement. The following recommendations were developed on the basis of the findings of the impact study:

1. Identify procedures, duties and responsibilities of meeting the overall objectives of Staff Industry Exchange.

A. Guidelines for supervisors who want information concerning the planning, operation, implementation and evaluation of the program.

B. Guide for educators who want to get involved in Staff Exchange.

C. Guide for business/industry person who want to get involved in Staff Exchange.

II. Changes in the roles of specific individuals involved in carrying out Staff Exchange responsibilities.

A. State Supervisor of Staff Exchange

B. Regional Contact Person

C. Immediate Supervisor

D. Regional Program Coordinator

E. Business/Industry Contact Person

F. Teacher Educator/Field Based Teacher Educator

G. Regional Director/Local Superintendent

H. Unit Director - Bureau of Vocational Education

III. Changes in forms, applications, work agreements, evaluations, etc. to document program activities under the new guidelines.

IV. System of accountability - to identify specific program improvements as a result of Staff Exchange (for each participant.)

V. Procedures to assess personal and professional development for each educator that will help them in keeping up-to-date in their occupational area (1-5 year plan).

IV. Direct involvement of the immediate supervisor in providing for the professional improvement of educators under his/her supervision.

VII. Providing in-service to participants to help them implement Staff Exchange work experience into their instructional program.

VII. Better communication of all people involved in the program. (As a result of definite guidelines and responsibilities).

IX. Better use of Staff Exchange funds in meeting program objectives.

-- Teacher education funding and travel
-- Regional contact person's travel and responsibilities

X. Provide business/industry with opportunities to actively participate in vocational education activities through short-term exchange in school.

Program improvement. These guidelines can help vocational educators to better incorporate their Staff Exchange experiences into the curriculum and make their program more responsive to the needs of students as well as the business and industrial segment of the community.

These guidelines will also be helpful to vocational administrators in planning, implementing and monitoring Staff Exchange activities for their personnel. Vocational administrators are concerned about keeping their teaching staff current with the practices that are presently being used in business and industry. They are also concerned that these current practices are reflected into their instructional programs.

Teacher educators can benefit from this research in the improvement of requirements, procedures and methods of working with teachers, administrators, and business and industry to facilitate the improvement of instruction.

Hopefully, these guidelines will be of benefit to all vocational educators in Kentucky. It will help vocational education planners to operate a quality program of "Staff Exchange" to gain up-to-date work experience. These guidelines can also be of help to business and industrial leaders in providing them with guidelines and procedures for increasing their involvement in vocational education.